

density difference between stress and rest CTP images) were assessed with the reference to hemodynamically significant stenosis, which was defined as $\text{FFR} \leq 0.8$ or angiographically tight stenosis judged prospectively by each operator.

Results: From 210 epicardial arteries, hemodynamically significant stenosis was observed in 86 (41%) arteries. Per-vessel sensitivity and specificity of CTP by visual assessment were 80% and 95% in all patients, 87% and 100% in those with severe coronary calcium, and 75% and 90% in those with multivessel disease, respectively. From quantitative parameters, TPR showed the most accurate diagnostic performances with AUC of 0.759, sensitivity of 75%, and specificity of 71%. Mean radiation dose for CTP and CTA was 6.6 and 6.0 mSv, respectively.

Conclusion: Stress myocardial CTP appears a feasible method for identification of inducible ischemia in patients with suspected CAD. The diagnostic accuracy of CTP may be improved if both visual and quantitative analytic results are taken into account together.

	CTP	CTA, DS $\geq 50\%$	QCA, DS $\geq 50\%$
Sensitivity,%	80 (70 – 88)	99 (94 – 100)	86 (76 – 92)
Specificity,%	95 (90 – 98)	73 (65 – 81)	91 (84 – 95)
PPV,%	92 (83 – 97)	72 (63 – 80)	87 (78 – 93)
NPV,%	87 (81 – 92)	99 (94 – 100)	90 (83 – 94)
Kappa statistic	0.77 (0.68 – 0.86)	0.68 (0.59 – 0.78)	0.77 (0.69 – 0.86)
Accuracy	89	84	88

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Risk of Stent Fracture, Longitudinal Compression, and In-stent Restenosis After the First- and Second-generation Drug-eluting Stent Implantation: Evaluation Using Coronary CT Angiography

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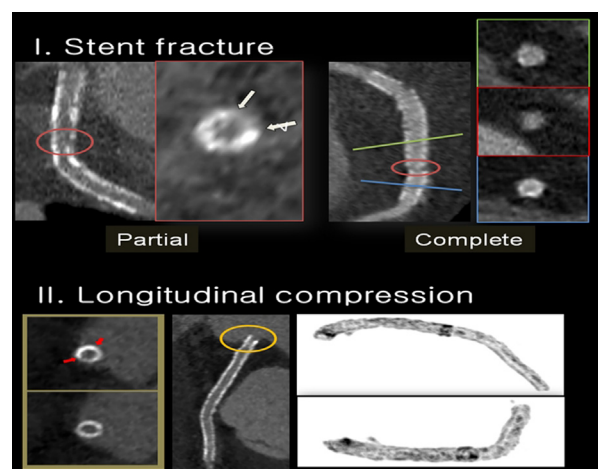
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Background: to evaluate the incidence and clinical impact of stent fracture, longitudinal compression and in-stent restenosis after drug-eluting stent (DES) implantation using the coronary computed tomography (CT) angiography.

Methods: A total of 644 coronary lesions from 445 patients who underwent coronary CT evaluation following DES implantation were retrospectively enrolled. CT angiography was taken using a dual source CT (either first or second generation) scanner and was analyzed by two independent radiologists. The first- (sirolimus- and paclitaxel-eluting stents; n=368) and second- (everolimus-, biolimus-, and zotarolimus-eluting stents; n=234) generation DES were used for lesions.

Results: The incidences of all stent fracture, complete stent fracture, longitudinal compression, and in-stent restenosis were 9.6%, 3.2%, 3.3% and 2.8%, respectively. Lesions with excessive tortuosity showed a higher incidence of stent fracture (all fracture 24.0% vs. 8.3%, $p < 0.001$; complete fracture, 14.0% vs. 2.2%, $p < 0.001$). Longitudinal compression was significantly higher in ostial lesions (24.5% vs. 1.4%, $p < 0.001$). In-stent restenosis was more frequent in a lesion with stent fracture, but the difference was not statistically different (all fracture 17.6% vs. 9.4%, $p = 0.472$; complete fracture 5.3% vs. 2.7%, $p = 0.959$). There was a tendency of a lower incidence of stent fracture (all fracture 9.0% vs. 10.7%, $p = 0.579$; complete fracture 0.4% vs. 4.9%, $p = 0.004$) and in-stent restenosis (1.3% vs. 3.8%, $p = 0.116$), but had a higher incidence of longitudinal compression (8.1% vs. 0.3%, $p < 0.001$) following implantation of the second-generation DES compared with the first-generation DES.

Conclusion: Coronary CT is a feasible method to detect stent fracture, longitudinal compression and in-stent restenosis after DES implantation. The second-generation DES appears to have a higher risk of longitudinal compression, but have a lower risk of complete stent fracture.



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Is Non-enhanced Cardiac Computed Tomography Valuable for Prediction of Distal Embolism During Percutaneous Coronary Intervention?

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Background: Low attenuated plaque (LAP), napkin ring sign (NRS) in coronary Computed Tomography (CT) and attenuated plaque (IVUS-AP) in intravascular ultrasound (IVUS) were reported to be good predictive factors of distal embolism (DE) during percutaneous coronary intervention (PCI). However, Contrast media induce plaque CT density to be higher than in reality and small or small-dense calcification tends to be similar CT density to contrast media. Therefore enhanced CT image has some misunderstood histological diagnosis. We studied possibility of non-enhanced cardiac CT in the matter of prediction of DE during PCI.

Methods: Consecutive 79 de novo stable lesions of 56 cases which underwent ECG gated non-enhanced cardiac CT before PCI between April 2011 and November 2013 were studied retrospectively. Rotablator use, chronic total occlusion, in stent restenosis and poor CT image lesion was excluded. CT examination was performed by 64 row machine and all PCI was performed with IVUS guidance and coronary stent implantation. Plaque location was identified by comparing to coronary angiogram (CAG) and suspected lesion was checked CT density by color map method. The lesion which minimum CT density is under -20HU component was defined as non-enhanced very low attenuated plaque (NE-vLAP) and over 130HU component was defined as calcium.

Results: 8 lesions (10%) had DE in this population. Positive predictive value (PPV) and negative predictive value (NPV) of NE-vLAP, NRS and IVUS-AP were 21.6%/100%, 33.3%/95.3% and 50.0%/100%, respectively. In combination prediction of NE-vLAP+NRS, NRS+IVUS-AP, NE-vLAP+IVUS-AP and NE-vLAP+NRS+IVUS-AP were 50.0%/95.7%, 83.3%/95.9%, 66.7%/100% and 100%/95.9%, respectively.

Conclusion: Each of NE-vLAP, NRS in non-enhanced coronary CT image were good predictor of DE but inferior to IVUS-AP. Combinations of NE-vLAP+IVUS-AP and NE-vLAP+NRS+IVUS-AP improve the predictive potential of DE compared with IVUS-AP single factor.

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Effects of Left Atrial Strain on Functional Capacity in Severe Organic Mitral Regurgitation

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Background: Decreased left atrial (LA) strain was noted in patients with severe organic mitral regurgitation (MR). However, effects of LA deformation on functional capacity of patients with severe MR were not fully studied. The aim of this study was to investigate the effects of LA deformation on severity of symptoms in patients with severe organic MR.

Methods: This study recruited 110 (55% men, 57 ± 16 years) consecutive patients with severe organic MR and preserved left ventricular systolic function who underwent echocardiography in the outpatient clinic. LA deformation including strain and strain rate were assessed by two-dimensional speckle tracking echocardiography with commercialized software. Global peak LA longitudinal strain (LAS), peak strain rate in reservoir phase (LASRr), and in conduit phase (LASRc) were identified from strain and strain rate curves. Severity of heart failure symptoms were evaluated by New York Heart Association (NYHA) functional classification.

Results: There were 35 (32%) patients in NYHA I, 62 (56%) in NYHA II, and 13 (12%) in NYHA III. Age (50 ± 13 , 60 ± 17 , 65 ± 16 years; $p = 0.004$), presence of